

The Effects of Color on the Moods of College Students

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Abstract

This research aims to discover the psychological effects of colors on individuals, using the students' union complex in a university campus. This building was chosen due to its richness in color variances. The research method is survey, and questionnaires were drawn up and distributed to an even range of students, comprising both international and local students; undergraduate and graduate. Questionnaires have been collected and analyzed to find out the effects different colors had on students' moods in different spaces of the students' union complex. This research would contribute to understand more about colors and how they affect our feelings and therefore to make better decisions and increase the use of spaces when choosing colors for different spaces to suit the purpose for which they are designed.

Keywords

color, mood, architectural space

Introduction

We live in a world of color (Huchendorf, 2007, p. 1). According to the various researches, the color that surrounds us in our daily lives has a profound effect on our mood and on our behavior (e.g., Babin, Hardesty, & Suter, 2003; Kwallek, Lewis, & Robbins, 1988; Kwallek, Woodson, Lewis, & Sales, 1997; Rosenstein, 1985). In clothing, interiors, landscape, and even natural light, a color can change our mood from sad to happy, from confusion to intelligence, from fear to confidence. It can actually be used to “level out” emotions or to create different moods (Aves & Aves, 1994, p. 120). The design of an environment through a variety of means such as temperature, sounds, layout, lighting, and colors can stimulate perceptual and emotional responses in consumers and affect their behavior (Kotler, 1973 in Yildirim, Akalinbaskaya, & Hidayetoglu, 2007, p. 3233). Therefore, it may follow that if we could measure it, we may get a clue as to how our mood varies when in any enclosed space. The ambiance of the interior space affects the users' behaviors and perception of that place by influencing their emotional situation. In this context, it is believed that the various physical components including light and color have a great importance on the environmental characteristics of space, especially in public use like students' union centers.

Hence, using the appropriate color in design is important in such buildings. It is also significant to draw cognitive map and way finding in interiors. Environmental interventions that promote way finding can be implemented on two levels: the design of the floor plan typology and environmental cues, which comprise signage, furnishings, lighting, colors, and so on. Vivid color coding may enhance short-term memory and improve functional ability (Cernin,

Keller, & Stoner, 2003). So the use of color is one of the crucial elements in designing the appropriate circulation of public interiors. Furthermore, the function, surrounding environment, the users' profile are also important factors which interactively be effectual on people's emotional situations. Therefore, colors must be studied in real contexts because they are experienced in environments where complex patterns interact with perceptions and behavior (Tofle, Schwarz, Voon, & Max-Royaie, 2004).

This research study is conducted to discover the psychological effects of colors on individuals, using the students' union complex as a research area.

Problem Statement

Color has been found to increase a person's arousal (Huchendorf, 2007). They have a subterranean consequence on how people feel both psychologically and physically. Various colors represent various moods; therefore, the need to know what color to paint a particular enclosed space is necessary so that the space will be best utilized by its intended users. Color, is one of the effective factors in a space which influences the way individuals express their emotions.

According to Birren (2006), colors have many emotional impacts, namely, temperature, strong and weak, hard and

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soft, and active and calm. For hardness and softness, brightness and low saturation create a soft feeling, whereas dimness and high saturation create a hard feeling. Also, weaker contrast and saturation convey calmness as opposed to stronger contrast and saturation, which convey activeness. Warm colors are those that are vivid in nature. He also asserted that warm colors, such as red and yellow, increase arousal more than cool colors, such as green and blue. Similarly, Pamuk and Gökner (2002, p. 204) define red by its own words as “I’m so fortunate to be red! I’m fiery. I’m strong. I know men take notice of me and that I cannot be resisted.”

Likewise, Johannes Itten (1973) claimed that, as red is always active, so blue is always passive, from the point of view of material space. From the point of view of spiritual immateriality, blue seems active and red passive. Blue is always cold, red is always warm. Blue is always shadowy, and tends in its greatest glory to darkness. When blue is dimmed, it falls into superstition, fear, grief, and perdition, but always it points to the realm of the transcendental. Moreover, Greene, Bell, and Boyer (1983) determined that warm colors increase stimulation compared with cool colors.

All architecture, from prehistoric times to the end of the Baroque era, involved some use of color (Meyhöfer, 2008, p. 6). Colors are all about us and the sheer variety of shades used, for instance in interior decorations, are an indication (Carruthers, Morris, Tarrier, & Whorwell, 2010). So in a deep sense, the architect only ever thinks in color, builds in color, and huge part of our experience of architecture is not as proceeding color from the object but making the color of the object. Color is one way to think the whole field of architecture, the same way that ecology is a way to think (Serra, 2011).

Consequently, it is certain that, color is impressive and memorable within a context. The perception of any indoor or outdoor space is directly related to its color and in fact it is necessary to search the users’ awareness of the place where their activities occur. Therefore, the student activity center in campus will be investigated.

Aim of the Study

This research was undertaken to find out how individuals react when in an enclosed, colored space; if their moods change and if colors can increase stimulation, and stimulation can increase memory, then it is possible that we could find that color can increase memory. Furthermore, colors are frequently used to describe emotions such as “green with envy,” “red with rage,” and being “in the blues” when depressed (Carruthers et al., 2010). Color can perform a multitude of roles and can affect a person’s emotions, energy level, and sense of order, or disorder. As well it can set the tone of interior and make it seem formal, or informal, masculine or feminine, coolly aloof or invitingly warm (Poore, 1994). Dirk Meyhöfer (2008)

claimed that “architecture and color . . . is a vast field, occasionally even a love-hate relationship; but always a fascinating area of activity for architects and designers” (p. 6). After all, color by its very nature—whether surviving its effect is cool or warm, light or dark, introverted or extroverted—is defined through the interplay of light and shade, through location and other environmental influences. In other words, color changes with its surroundings. Red, for example, is never the same tone but changes depending on the surface material and the neighboring surfaces that may swallow or reflect light.

Colors are psychological experiences. To explain them reductively with neurological processes (if that is possible) requires linking propositions that attempt to create a credible link between subjective experiences and objectively measured data related to neural responses or physical measures of reflectance—or spectral power (Kuehni, 2003, p. 339). Color is fundamental to sight, identification, interpretation, perceptions, and senses. Some colors evoke psychological reactions through signals such as warmth, relaxation, danger, energy, purity, and death (Courtis, 2004, p. 266). According to Angela Wright (1998, p. 23), the psychology of color works as follows: When light strikes the eye, each wavelength does so slightly differently. Red, the longest wavelength, requires the most adjustment to look at it, and therefore appears to be nearer than it is, while green requires no adjustment whatever, and is therefore restful. In the retina, these vibrations of light are converted into electrical impulses which pass to the brain—eventually to the hypothalamus, which governs the endocrine glands, which in turn produce and secrete our hormones. In simple terms, each color (wavelength) focuses on a particular part of the body, evoking a specific physiological response, which in turn produces a psychological reaction. Particular colors have very different effects on each individual. Response to a color may be influenced by a number of factors such as the body’s need for a specific color, a sad or happy memory associated with a color, family history, or current trends (Aves & Aves, 1994, p. 120).

In general, the main aim of this study is to investigate the psychological effects of different colors used in the student complex and discuss the significance and proper use of colors in common spaces.

Scope of the Study

An interior is a three-dimensional world that completely envelops you in color; color surfaces are all around you, above you, and beneath you. Interior color is, therefore, experienced quite differently from any other color use (Miller, 1997, p. 9). This research will study the various colors, how they are perceived by individuals, their psychological properties and how they also affect individual’s mood in enclosed spaces in context of the student union complex.

Limitations

All the colors of the color wheel were not used in the students' union complex, therefore the full psychological effects of all the colors would not be completely accessed. This research and its findings are limited to the university where the research is done.

Literature Review

Definition of Color

Color is the visual perceptual property corresponding in humans to the categories called red, green, blue, and others. Color derives from the spectrum of light (distribution of light energy versus wavelength) interacting in the eye with the spectral sensitivities of the light receptors (Brodie, n.d.). The seven colors of the spectrum are produced by light waves of varied lengths that reflect off tangible animate and inanimate objects (Marberry, 1995, p. 15). Light and color are simply a matter of vibrational frequency. Chromatics, the science of color, is the study of this relationship (Graham, 1990).

The narrow band of energy that the human eye can detect extends from 380 nm at the red end to 760 nm at the violet end. Sunlight produces all color wavelengths. When human eyes interpret the wavelengths of light reflected from an object, they see color (Day & Rich, 2009). Wright (2008) defines color as, "color is light, which travels to us in waves from the sun, on the same electro-magnetic spectrum as radio and television waves, micro waves, x-rays etc." The human eye is capable of seeing over 7 million colors. These colors are gotten from the basic blocks of the primary, secondary, and tertiary colors.

The primary colors. The primary colors are the three basic hues red, blue, and yellow (Aves & Aves, 1994). These colors cannot be created by mixing others, and they are the basis of all the other shades of colors which they generated. If the primary colors are mixed in equal amounts, the resulting color is always black.

The secondary colors. These are the colors that are achieved by mixing equal amounts of two primaries. There are three secondary colors: green (a mixture of red and yellow), orange (a mixture of blue and yellow), and violet (a mixture of red and blue).

The tertiary colors. Tertiary colors are achieved by mixing equal amount of primary and secondary hues. There are six tertiary colors which are lime as a mixture of green with yellow, purple as a mixture of violet with red, saffron as a mixture of orange and red, lavender as a mixture of violet with blue, amber as a mixture of yellow with orange, and turquoise as a mixture of green with blue.

When blending black or white to these colors, tints and shades will be the results, while tones describe the depth of

a color. Neutrals are subtle shades from the palest range of colors (beige, cream), and are used for balancing vibrant or rich colors.

Cold colors have a high proportion of blue in their make-up such as violet blue and some greens and they have a calming effect. Warm colors are energizing, have more red and yellow in their make-up.

Combining Colors

Colors can look quite different in combination; they play a trick on the brains at times, it is therefore important when designing interior spaces to use the color wheel. The color wheel shows the relationships between the colors of the spectrum. Wright claimed that, the complementary colors are red/green, blue/orange, and yellow/violet. In color psychology, the importance of this becomes clearer when we realize that complementary colors, when put together, present perfect balance, as all the pigment primaries are then present:

Red and (Blue + Yellow)

Blue and (Red + Yellow)

Yellow and (Red + Blue) (Wright, 1998, p. 23)

As seen in Figure 1, the contrasting colors sit opposite each other on the color wheel. They are also referred to as complementary colors by interior designers ("Understanding Colour," 2004). On the color wheel, harmonious or complementary colors are next to each other, warm colors are on the orange side, and cool on the blue side.

Knowing what color to paint and combine in a given interior space so as to evoke the desired mood should be the objective of every interior designer. Different shades of color can be used in creating illusions and effects, for example, the eye can be drawn to a particular object in a room by varying the tone of the color in relation to the color of the wall on which it leans on in the room.

The Context of Color

Color, is one of the effective factors in a space which influences to express one's emotion. A single color can have series of meanings and interpretations to various people in various regions of the world; take for example the people of China who see white as a sad color because they wear white when mourning whereas some other societies in Europe perceive it as purity, virginity, and cleanliness. De Bortoli and Maroto (2001) also states that in Asia, orange is a positive, spiritually enlightened, and life-affirming color, whereas in the United States, it is a color of road hazards, traffic delays, and fast-food restaurants.



Figure 1. Color wheel.

Source. Adapted from *Interior color by design: A design tool for architects, interior designers, and homeowners*, by J. Poore, 1994, Gloucester, MA: Rockport. Copyright 1994 by Rockport Publishers.

Colors can be used to also distinguish between a series of activities like fun and serious, old and young, and female and male.

Psychological Properties of Colors

Wright (2008) defines it as the effects of the electro-magnetic radiation of light on human mood and behavior—a universal, psychophysical reaction, which is not as heavily influenced by culture, age, and gender as is generally thought.

It must be noted that there is a great difference between color psychology and color symbolism. The context of color can be understood to be color symbolism whereas the psychological properties of color is associated with moods of people in general.

Wright (2008) says there are four psychological primary colors: red, blue, yellow, and green. They relate, respectively, to the body, the mind, the emotions, and the essential balance between these three. The emotional effects of the basic colors are as follows:

Red. Being the longest wavelength, red is a powerful, strong, and very basic color. It has the property of appearing to be nearer than it is and therefore it grabs people's attention first. It may activate the "fight or flight" instinct. Pure red is the simplest color, with no subtlety. It is stimulating and lively, very friendly. At the same time, it can be perceived as demanding and aggressive. Although the red colored spaces have courage, strength, warmth, energy, basic survival, "fight or flight," stimulation, masculinity, excitement effects on people (Wright, 1998). Defiance, aggression, visual impact, and strain are among the negative impacts of red color.

Yellow. According to Eiseman (2006),

Yellow is thought of as joyful, outgoing, open, and friendly. Psychologically, yellow is the strongest color. In color-mood association studies, yellow is associated with comedy, a happy mood, and playfulness. Yellow ribbons have been used as a sign of hope and optimism since the nineteenth century (p. 45).

Psychologically, yellow is the strongest color, it is about emotions, self esteem, and creativity (Wright, 1998).

Light pastel yellows are seen as childlike. Canary yellow is delicate and feather soft. Ambered yellows are perceived as mellow and warm. Yellow is most associated with words like "cheerful," "jovial," "joyful," and "sunny"; somewhat associated with "exciting" and "stimulating"; and almost never associated with "despondent," "dejected," "melancholy," or "unhappy." Yellow as a color lets the sunshine in.

Green. Green is considered an emotionally calming color. It gives a sense of refreshment, harmony, and equilibrium. It symbolizes universal love, environmental awareness, and peace. Leatrice Eiseman (2006) claims that people find cool shades of blue and green and neutral earth tones to be relaxing because these colors remind of nature. Because green has the power to help people adjust to new environments, skillful designers use lots of plants and other forms of green in hotel lobbies, offices, and restaurants (Aves & Aves, 1994). Although it is the color of balance, it may have negative effects too, such as being too bland, bore, and demoralizing when incorrectly used.

Blue. Blue encourages intellectual activity, reason, and logical thought. It is the color of the intellect. In the same evidence about raising blood pressure with red, blue is deemed to lower the blood pressure. Certainly, it is a soothing, calming color, encouraging reflection. Nature uses it in the sky and the sea (Wright, 1998, p. 27). Strong blues stimulate clear thought and lighter, soft blues calm the mind and aid concentration.

How Color Psychology Works

When light strikes any colored object, the object absorbs only the wavelengths that exactly match its own atomic structure and reflects the rest to the observer. When light strikes the human eye, the wavelengths do so in different ways, influencing our perceptions. The hypothalamus is the part of the brain governing our hormones and our endocrine system, when light hits the retina it is converted to electrical impulses that are then transmitted to the hypothalamus for interpretation.

The hypothalamus houses the body's biological clock (Wright, 2008). This is so because it governs our body's temperature, our appetite, sexual functions, sleeping, and behavioral patterns, and so on. It has been proved several times that color has a physical effect on humans due to its energy; an experiment carried out on blind people to identify some colors resulted in these blind subjects identifying the colors with no problems at all.

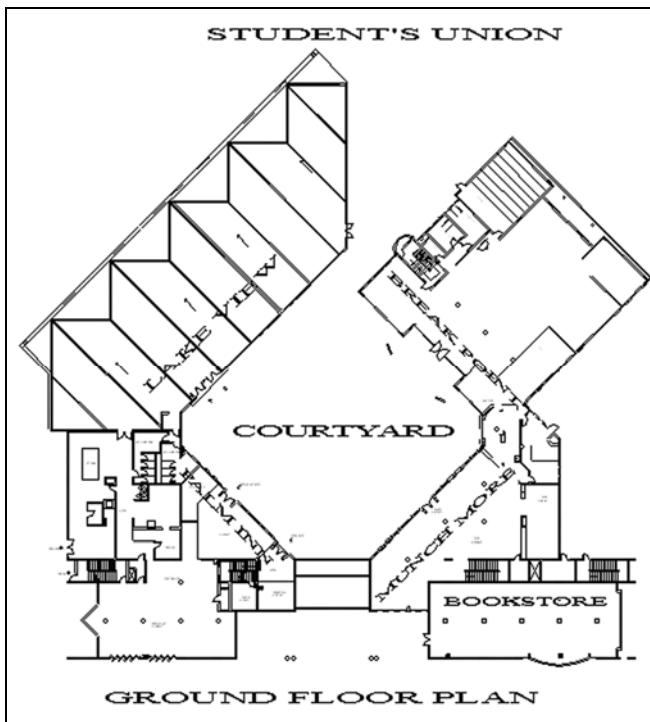


Figure 2. The courtyard.



Figure 3. Break Point from the courtyard.

Method

Area of Study

The site chosen for this research is the students' union complex on the university campus.

The campus is situated 5 km away from the city center. The climate is hot and dry during summer, mild and rainy in the winter. Over 5,000 students are being educated in the university and more than 60% of them accommodate on the campus. Social and dining activities mostly occur in the student union which is placed around the main courtyard between academic units and dormitories.



Figure 4. The entrance door of Munch More.



Figure 5. The Lake View cafeteria.

The Courtyard

As seen in Figure 2, the courtyard sits in the middle of all the spaces which will be mentioned below; Break Point, Munch More, Palm Inn, and Lake View cafeteria. So, its surrounding walls happen to be the exterior walls of the mentioned spaces. The view is very exciting due to the warm colors and nicely colored and patterned names on the Palm Inn, Break Point, and Munch More. The view of the cafeteria is neither so exciting nor relaxing because a large surface area is painted white, and its link with the Palm Inn which is also white which increases the drabness effect that is created (see Figure 5).

Figure 3 shows the exterior of Break Point. The photo in Figure 4 taken from the courtyard shows the exciting and colorful exterior of Munch More. Arched doors and windows are placed in the ground floor, whereas different composition on the elevation effectively can be seen on the upper part of the building. Figure 5 shows the façade of Lake View cafeteria with its modest entrance. The left part of the block connects the Palm Inn to the main dining hall. The last image is from the courtyard showing the exterior wall of Palm Inn restaurant (Figure 6).



Figure 6. Image showing the exterior of the Palm Inn.

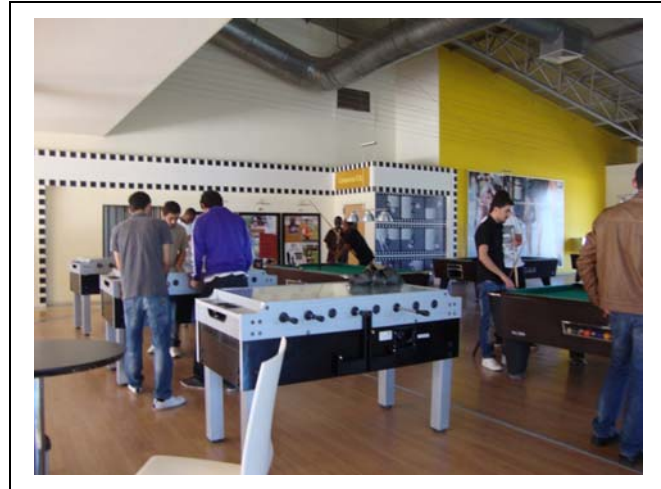


Figure 9. Interior space of Break Point.



Figure 7. Interior space of the Lake View cafeteria.

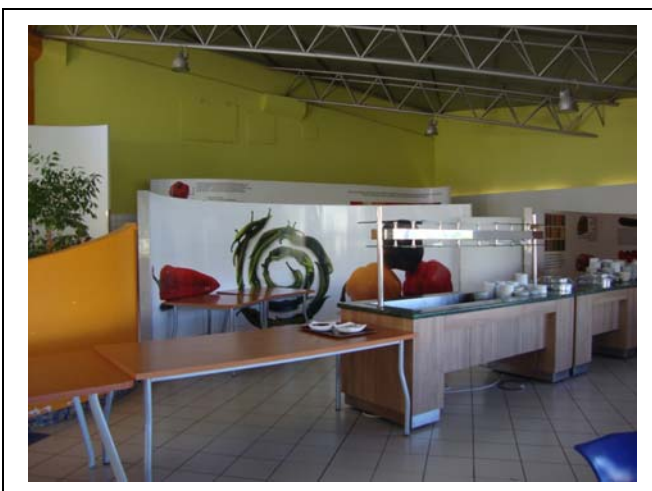


Figure 8. The large poster with vegetables on it in Lake View cafeteria.

Data Collection Procedure

The study area was visited and direct observations and assessments were completed, then later, a questionnaire was generated; measures were taken to make the questions as simple and straightforward as possible so as to lead them in the direction of the aim of the research and not to confuse them so as to obtain reliable results from the analysis of the answers they give.

Direct Observations

The interior spaces of the students' union complex were explored and observed by the researcher. The details of these observations are stated as follows:

Lake View cafeteria

1. The use of warm colors: yellow, orange, and red was evident. White is also used.
2. A large surface area was painted in white (see Figure 7)
3. Vegetable poster (see Figure 8) was well placed as a sign that food being served is healthy.

Break Point and Munch More

1. The colors and patterns used on the interior walls (Figure 11) complemented each other.
2. It was noticed that only few warm colors were used in these spaces as seen in Figures 9 and 10.
3. Although there are some parts that lacked warm or inviting colors, nice and colorful artworks were used to adorn some walls also as seen in Figure 12.

Palm Inn

1. The interior color of the walls and furniture are really nice and inviting.



Figure 10. A section of the interior space of Munch More.

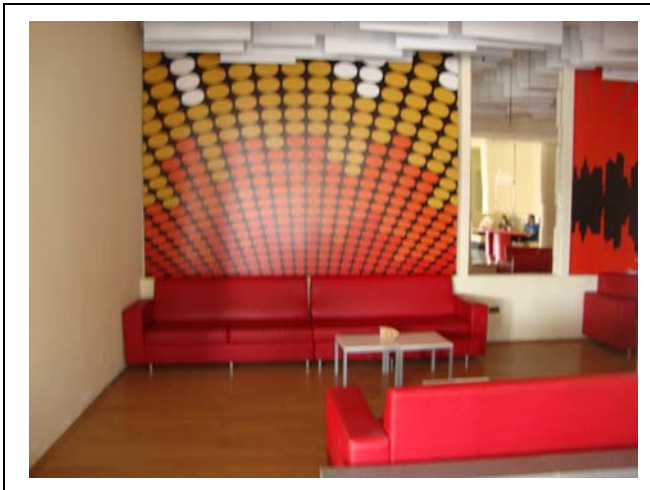


Figure 11. Artworks complementing the surrounding furniture in Munch More.

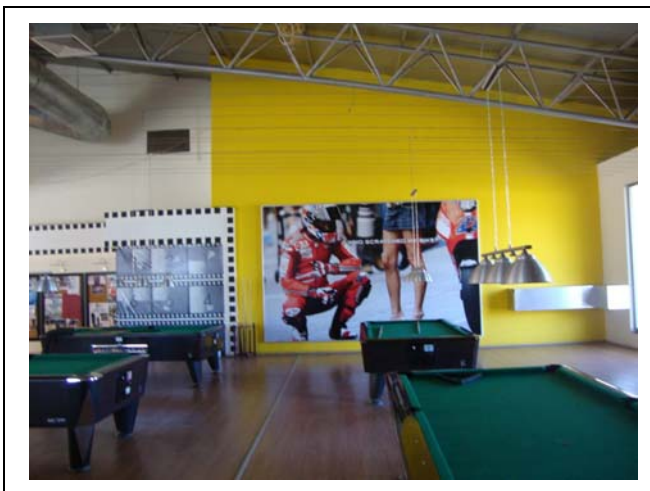


Figure 12. Artworks decorating the walls in Break Point.

2. Graffiti-like artwork was used in adorning the walls which had glass.



Figure 13. A section of the interior of the Palm Inn.

3. The finishing and combining of colors is very classy and suits the category of individuals the space is intended for.
4. Different saturation of the color green was used in making round shelves.
5. A section of the interior of the Palm Inn, as seen in Figure 13, had an interesting color combination going on and seemed really matured, the wall was gray and with a strip of light green in its middle.

Findings and Analysis of Data

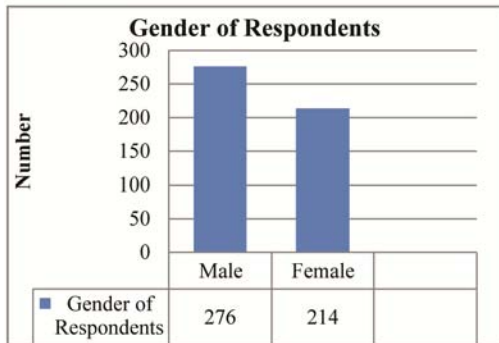
Around 550 questionnaires were distributed randomly to users of the complex at different times of the day. Four hundred ninety of them were successfully retrieved and therefore the analysis of the results would be of four hundred ninety respondents. The analyses of the questionnaires are as following:

Respondent's gender. From the graph, it is deduced that the highest respondents were male with a total number of 276 as compared with the females who were 214 in number. Graph 1 in Figure 14 shows the gender of respondents, the horizontal axis of the graph indicates the sex while the vertical shows the number count of the particular sex.

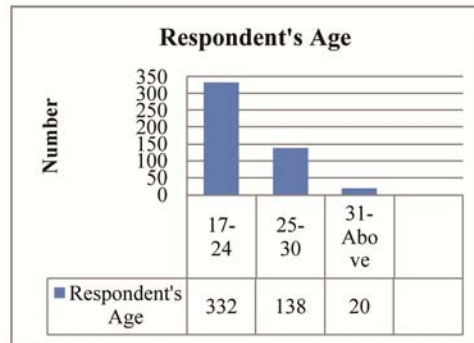
Respondent's age. The highest respondents of this questionnaire fell in the age bracket of 17 to 24 as shown in the graph with a total number of 332, then followed by the age bracket of 25 to 30 with 138 respondents, then the least fell in the age bracket of 31 and above with just 20 respondents.

From Graph 2 (see Figure 14), it is easily deduced that the highest respondents are students with a total number of 460; the reason is not farfetched from the fact that the area of study is the student complex. The lower respondents are the staff with just 30 in number.

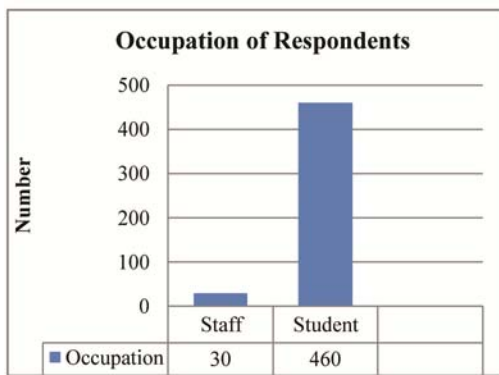
GRAPH 1.



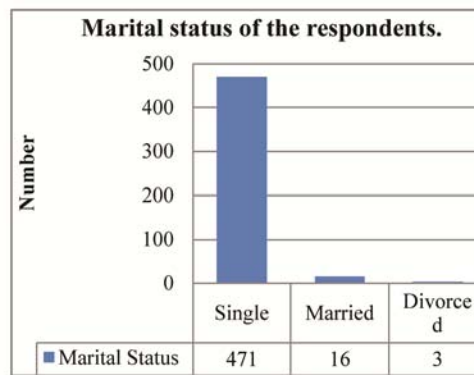
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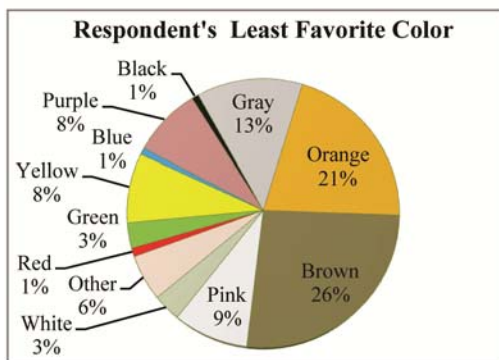
GRAPH 3.



GRAPH 4.



GRAPH 5.



GRAPH 6.

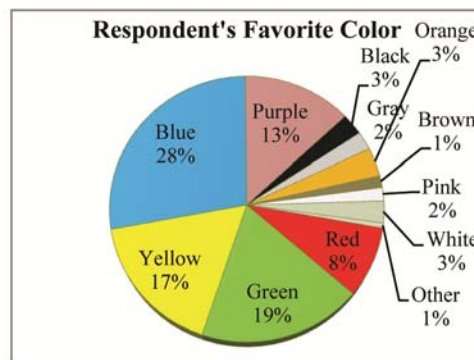


Figure 14. Statistical information about respondents.

Marital status of the respondents. The highest level rise is that of the singles with a total number of 471, and the lowest being just 3 respondents as divorcees, the married respondents were 3 as well, as indicated in the graph.

Respondent's least favorite color.

As seen on Graph 5 in Figure 14, brown (26%), orange (21%), and gray (13%) comprise the majority of negative responses.

Respondent's favorite color. The highest level on Graph 6 in Figure 14 is that of others, with a total percentage of

28, indicating that most respondents' favorite color was blue which turned out to be highly favored with a total count of 136, followed by green with 92, by yellow with 83, and by red with 42 respondents favoring them, respectively.

The number of the respondents for each option of the answers is given in Table 1; the graphs showing respondents' perception on space and color are shown in Figure 15; and other relevant questions which are replied by the respondents are analyzed. The following are the deductions:

Table 1. Analysis of the Data.

Likert-type questions	Strongly agree	Agree	Disagree	Strongly disagree	Do not know/NA
1. The colors used for the exterior of the students' union complex are well combined	198	287	5	—	—
2. The colors used reflect the purpose for which the complex was built.	164	245	23	41	19
3. Some colors should have not been used.	76	136	240	26	12
4. More colors should have been used.	78	156	241	2	13
5. Your excitement level increases as you approach the complex due to the colors used on the complex.	134	192	126	38	—
6. The colors of the complex complement the environment and give a sense of belonging.	142	205	110	18	15
7. The interior color of the Palm Inn is warm and inviting.	105	227	101	39	18
8. The interior color of the cafeteria is warm and makes your meal enjoyable.	121	210	58	99	2
9. The interior color of Break Point makes you restless or too excited.	130	202	121	37	—
10. All interior colors of spaces of the student union complex were painted in colors that reflect their purpose.	84	212	168	16	10
11. Events that take place within the complex remain vivid in your memory.	76	334	66	110	14

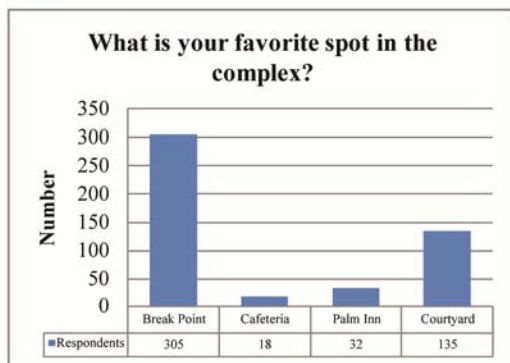
- Four hundred eighty-five respondents claimed that the colors used for the exterior of the students' union complex were well combined.
- Four hundred nine respondents supposed that the colors used reflect the purpose for which the complex was built. Two hundred sixty-six respondents were against the idea that some colors should not have been used.
- Two hundred twelve respondents stated that some colors should have not been used in the student union.
- Two hundred forty-three respondents found it unnecessary to use more colors.
- Three hundred twenty-six respondents claimed that their excitement level increased as they approached the complex due to the colors used on the complex.
- Three hundred forty-seven respondents felt that the colors of the complex complemented the environment and gave a sense of belonging.
- Three hundred thirty-two respondents believe that the interior color of the Palm Inn is warm and inviting.
- Three hundred thirty-one respondents declared that the interior color of the cafeteria was warm and made their meal enjoyable.
- Three hundred thirty-two respondents stated that the interior color of Break Point made them restless or too excited.
- Two hundred ninety-six respondents claimed that all interior colors of spaces of the student union complex were painted in colors that reflected their purpose.
- Four hundred forty respondents declared that events that took place within the complex remained vivid in their memory.
- Three hundred five respondents chose the Break Point as their favorite spot (see Graph 7 in Figure 15).
- Most of the respondents (260) said they did not mind how long they spent in their favorite spot (see Graph 8 in Figure 15).

- Three hundred ninety-three respondents were not in favor of the color of their favorite spot been painted a different color (see Graph 9 in Figure 3). However, when asked to those who agreed their favorite spot to be painted a different color, what color they preferred, they were unsure what color to choose.
- Forty-two individuals responded to using another color while another 48 respondents had no comments. From the given color options, red was the most favored color with 26 respondents, and blue and green were at a tie with 11 apiece.
- None of the respondents claimed to feel depressed in their favorite spot (see Graph 10 in Figure 3).
- Three hundred eleven respondents claimed that communication between them and friends strengthened in the complex (see Graph 11 in Figure 15). Break Point is the spot where communication among peers strengthened with 375 respondents, followed by the Palm Inn with 48 respondents, then the courtyard with 42 respondents. Twenty-five of the respondents had no comments.
- The place of boredom as deduced from the chart was the cafeteria with 191 respondents selecting the place as the venue where they easily got bored (see Graph 12 in Figure 15).

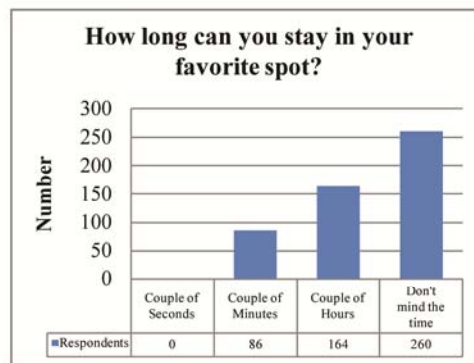
Results and Discussions

It is important to reiterate that, for a color study to be successful, confounding variables such as subjects' age, gender, emotion, hue, brightness, saturation, light sources, adjacent colors, contexts, and cultural factors must be precisely controlled (Park, 2009, p. 27). In this research, all questions which have graphs in Figure 2 were in this direction and respondents responded in favor of the claim.

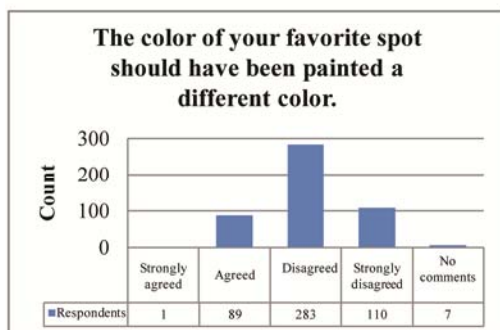
GRAPH 7.



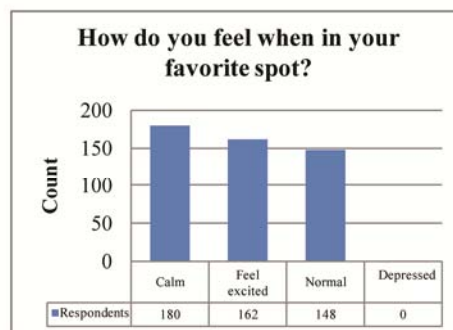
GRAPH 8.



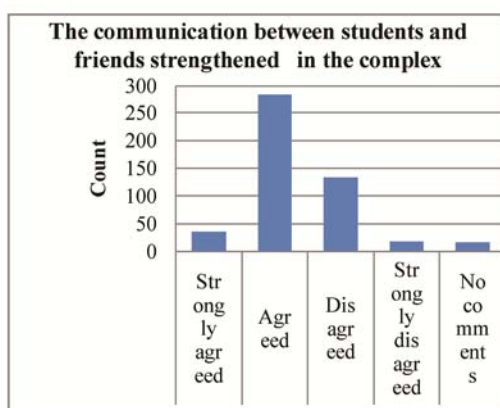
GRAPH 9.



GRAPH 10.



GRAPH 11.



GRAPH 12.

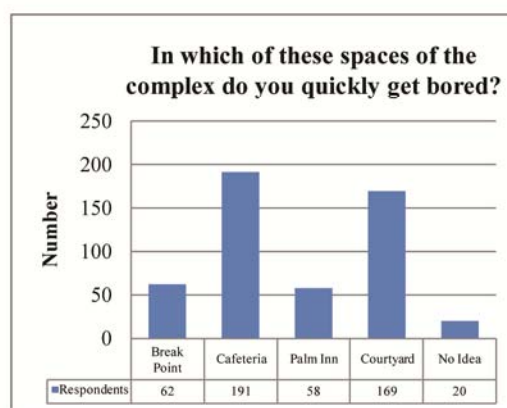


Figure 15. Graphs showing respondents' perception on space and color.

The analysis of the research questions indicates that the colors used for the exterior of the students' union complex are well combined and the colors used on the complex whether interior or exterior reflect the purpose for which it was built. Respondents were contented with color selection of the student union, generally. They found the level of different color use enough and claimed that there is no need to use more color in the complex.

Analysis of related question as well as direct observation shows that due to the colors used on the complex, one gets excited on approaching the complex.

A shade of red is used extensively on the approach view of the complex. Wright (2008) states that red grabs our attention first, red also reflects entertainment and excitement. Studies finding red to be more arousing than other colors are reviewed by Kwallek et al. (1988). Similarly, it was proposed by Faber Birren (2006) that warm colors, such as red and yellow, increase arousal more than cool colors, such as green and blue, also Spence, Wong, Rusan, and Rastegar (2006) found that color increased the recognition of the natural scenes by approximately 5%.



Figure 16. The dining area of Palm Inn, light brown graffiti and art-like images on the walls.

Analysis of the Question 6 in Table 1 showed that the respondents were in favor of the colors of the complex complementing the surrounding environment. Mahnke (1996) says that in an environment there must be colors in changing hue, saturation and brightness, colors in changing temperatures, by this he means the use of warm and cool colors and the complementary of the dominant color should also be present to a certain degree. By the result and analysis, the complex is successful in complementing the environment by supporting Mahnke's theory and respondents responding in favor of the propositions put to them. It gives a sense of belonging to the place.

Analysis of the Question 7 in Table 1 shows that majority of respondents felt psychologically warm and invited in Palm Inn. Colors used in the space are shades of green, gray on the walls, and the dining furniture is black and brown tables covered in white and black clothing. Shades of green have a relaxing and refreshment effect. Pure gray is the only color that has no direct psychological properties, it is, however, quite suppressive (Wright, 2008), and black shows coldness and efficiency, and brown is similar to black but in a calmer way. But the factor of light should be considered very effective that direct sunlight coming from south direction through windows (see Figure 16) gives interior a warm and friendly atmosphere which is inviting to the people.

Analysis of the Questions 8 and 9 revealed that colors indeed have an effect on whether people feel warm, cool, calm, invited, relaxed, or uninvited. The analysis of this result supports the findings of the pink prison experiment (Schauss, 1979). According to the study, when inmates were placed in cells that were painted in bright pink color, they became less aggressive. Majority of respondents in the above questions agreed they felt either warm or restless in the spaces they found themselves. Concerning the rest of the questions, it is obvious that the students agreed that communication was strengthened in the Break Point or

courtyard. And according to most respondents' opinions and reminiscence, events that took place within the complex remained vivid in their memory. Correspondingly, Myers (2006) claimed that previous research had shown that moderate arousal could increase memory retention.

Analysis of the interview and open-ended questions show that a majority of the respondents perceived the white painted large exterior walls of Lake View cafeteria as boring and uninteresting.

Conclusion and Recommendations

The results of this research not only support most of the theories and results of other researchers but also reveal the psychological properties and effects of colors on the moods of individuals. The following recommendations have been made based on the research findings and results:

1. The need to balance complexity and unity is a major problem faced by most designers and from the design of the colors used for the exterior walls which make up the interior space of the courtyard, the problem is evident with the large surface area of the wall painted in white.

Unity and variety are the opposite of each other. The mark of good color arrangement is knowing where to stop between these extremes (Kathy, 2003). From the above, we can now understand that the white exterior wall of the Palm Inn that links directly with the Lake View cafeteria does not meet the requirement of balance, rather it is monotonous and therefore a little variety in terms of color should be thrown in to create the required balance.

2. The interior of the Lake View cafeteria that has the large surface area of white should also receive the same treatment suggested above.
3. As a large group of the users of the complex belong to the age group 17 to 24, it is recommended that graffiti art work be done on the white walls of the Lake View as a solution to the balance effect required.

The need to know the effects of colors on moods of individuals is very essential for architects. In most cases, the use of appropriate and/or correct colors would increase the functionality of that space.

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